



## **Strategies and Challenges in Mentha Crop Intervention against Blue Bull for Enhancing the Farmer Income**

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.*

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### **ABSTRACT**

Improving farmer's income through technological intervention is the urgent need in rural areas for making self-dependence and economic sufficiency. In this direction, a number of scientist farmers interaction meets were organized in KVK, Aurangabad. Farmers farm women, rural youth and girls enthusiastically participated in these programs like on campus farming off-campus training, kisan chaupal, kisan gosthi etc. raised several questions related to some their fruit and vegetables production against blue bull for income generation. Wide awareness and community participation is the need of the hour for the rational utilization and better conservation strategies of medicinal & aromatic plants. Medicinal cultivation is the emerging sector in agriculture diversification that would augment the income of small holders and generate employment opportunities in rural areas. It was felt that low marketing surplus of small landholders requires formation of co-operative groups for a contract for men with Patanjali/other agencies to help them to generate more income. Use of medicinal & aromatic plants may be available in our surroundings but due to lack of awareness, we

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never take care to collect, conserve and evaluate such precious materials. In addition, a holistic approach is required to manage the rich heritage of medicinal and aromatic plant with available in Bihar. The potential of medicinal & aromatic cultivation has been realized lately. There are many options available for farmers of all income and land holding groups to take up are or the other activity in medicinal and aromatic cultivation.

**Keywords:** *Mentha*; paddy; wheat; vegetable; blue bull; income.

## 1. INTRODUCTION

*Mentha arvensis* L. (Lamiaceae) commonly known as cornmint, menthol mint or Japanese mint was introduced into India in 1952 from Japan cornmint plant over ground main stems with big leaves and small flowers, stolons with crawling succulent stem and underground rhizomes. Essential oils obtained from natural resources are an important raw material in the perfumes and flavour industry. The natural origin of some components lends them great importance as premium materials in an application such as food grade flavors. Some compounds of *Mentha arvensis* L. were widely used as cooling compound in mint flavours, fruit flavours oral care product confection and beverages [1]. Phytochemical prospective and antimicrobial activity of *Mentha arvensis*. Chemical composition of *Mentha arvensis* leaves was determined and its in vitro antimicrobial activity against *Escherichia coli*, *Pseudomonas aeruginosa*, *Shigella flexneri*, *Klebsiella pneumoniae* and *Staphylococcus aureus*. Phytochemical analysis was found on leaves contains tannin, flavones, flavanols, xanones flavonols flavonoes and steroids. It is used in traditional medicine in infection disease [2]. In India folk medicine numerous plant products are used in the regulation of human fertility [3]. Among these, the leaves of the *Mentha arvensis* L. (Lamiaceae) the common edible aromatic herb, has been described to possess various medicinal properties effect.

## 2. MATERIALS AND METHODS

The experiment was conducted in farmers field of Aurangabad. The experimental plot had well drained sandy loam soil of good fertility with the levelled surface.

## 3. RESULTS AND DISCUSSION

The medicinal plant continues to be an important therapeutic aid for alleviating the ailments of human kind. The research for external health and longevity and for remedies to relieve pain and

discomfort drove early man to explore his immediate natural surrounding and led to the use of many plants, animal produce and mineral etc and the development of a variety of therapeutic agents [4]. Today there is a renewed interest in traditional medicinal and an increasing demand for more drugs from plant sources. The revival of interest in plant-derived drugs is mainly due to the current widespread belief that green medicine is safe and more dependable than the costly synthetic drugs.

### 3.1 Case Study of Sri Amresh Singh

Sri Amresh Singh son of Sri Abdesch Singh belongs to village Karamdih, Block Nabinagar, District Aurangabad. Sri Amresh Singh has completed his studies up to Graduation in 2007. Due to lack of Job he started helping his father in agriculture sector. The father use to cultivate only cereal crops like paddy, wheat and some pulse crop (lentil and gram) which was fulfilling his family but as his family member started increasing and due to modernization the demand of family was unable to fulfil the requirement of family.

Then Sri Amresh Singh thought for vegetable cultivation during 2013-14. He started growing vegetable in half acre of land. In kharif season he started cultivating tomato. Tomato gave a good return because his tomato was exported to different places he continued this cropping pattern for a longer time. Annually a cost of cultivation is Rs. 34,223 with gross return 77,745 and earned net profit of Rs. 43,612. But suddenly the blue bull attacked started. The blue bull use to graze all the vegetable at night. They started using different tips to chase away the blue bull but the formula failed and even they started guarding at night to protect their produce from blue bull.

This blue bull comes at night in groups called herds. They shy and sensitive in nature they have good eye sight and hearing, but they don't have a good sense of smell. Sri Amresh Singh face the blue bull problem for longer time he even visited district agriculture office for help.

After he plans to leave agriculture and he started and any other job when he came to know about Krishi Vigyan Kendra which was situated at Siris. Then he visited scientist, he narrated his whole story how he started earning good income and suddenly the disaster occurred. The blue bull use to vanish all his produced and now and he is compelled to leave agriculture because his economic condition was becoming poor and couldn't effort his family requirement then the KVK gave a new emerging idea about medicinal and aromatic cultivation [5]. But due attack of blue bull and loss in agriculture he was unable to adopt this technology but even he try to cultivate mentha crop in the 10 dismil field. He found the mentha crop is not disturbed by blue bull as well

as people he got 3 cuttings from a single crop and after extraction the oil by distillation and filtration he earns good income out of 10 dismil plot then the miracle occurred. He and other farmers started cultivating mentha crop in 8 acre in 2017.

He changed his farming system by cultivating paddy in kharif season, lentil in rabi season and Mentha in zaid season. After he started cultivating *Mentha* crop the cost of cultivation Rs. 12,000 with gross return Rs. 1,41,000 and earned net profit Rs. 1,29,000. A single *Mentha* crop gave good return as compared to other crop. Throughout the year he use to earn net profit of Rs. 1,57,166.

**Table 1. Before adoption of technology (One acre)**

| Crop      | Area (Acre) | Cost of cultivation | Gross return | Net profit |
|-----------|-------------|---------------------|--------------|------------|
| Paddy     | 1           | 13,376              | 24,562       | 11,276     |
| Wheat     | 0.5         | 5,455               | 9,817        | 4,362      |
| Vegetable | 0.5         | 15,392              | 43,366       | 27,974     |
| Total     |             | 34,223              | 77,745       | 43,612     |

**Table 2. After adoption of technology (One acre)**

| Crop          | Area (Acre) | Cost of cultivation | Gross return | Net profit |
|---------------|-------------|---------------------|--------------|------------|
| Paddy         | 1           | 13,376              | 24,562       | 11,276     |
| Lentil        | 1           | 4980                | 21,874       | 16,890     |
| <i>Mentha</i> | 1           | 12,000 (3 cutting)  | 1,41,000     | 1,29,000   |
| Total         | 1           | 30,356              | 1,87,436     | 1,57,166   |

**Table 3. Economics of 1 acre cultivation. High quality commercial cultivation of the crop age highly profitable venture for the small farmer**

| Sl. no. | Components                  | Proposed expenditure |
|---------|-----------------------------|----------------------|
| A.      | <b>Cultivation expense</b>  |                      |
| 1.      | Cost of planting material   | 5,000                |
| 2.      | Input cost                  | 3,000                |
| 3.      | Cost of labour              | 3,000                |
| 4.      | Others (power /irrigation ) | 3,000                |
|         | Total                       | 14,000               |
| B.      | <b>Irrigation</b>           |                      |
| 1.      | Tubewell /submersible pump  | 2,25,000             |
| 2.      | Sprinkler                   | 25,000               |
|         | Total                       | 2,50,000             |
| C.      | <b>Infrastructure</b>       |                      |
| 1.      | Store and pump house        | 65,000               |
| 2.      | Distillation unit           | 4,75,000             |
| 3.      | Agriculture equipment       | 10,000               |
|         | Total                       | 5,50,000             |
| D.      | <b>Land preparation</b>     |                      |
| 1.      | Soil leveling               | 4,000                |
| 2.      | Fertilizers                 | 3,500                |
|         | Total                       | 7,500                |
| E.      | <b>Labours</b>              | 3000                 |
|         | Grand total                 | 8,24,500             |

He sold menthe oil to Lucknow merchant and the different company of ayurveda assured him If he can provide 25000 liters of *Mentha* oil the merchant will come to farmer's place and purchase the Mentha oil.

Sri Amreshsingh also motivated the other farmers toward medicinal and aromatic crop and generated employment to poor farm men and women to live happily. Even Bihar government is helping medicinal & aromatic cultivars by giving subsidy of Rs. 20,000 per hectare.

#### 4. CONCLUSION

*Mentha arvensis* L. is commercially cultivated in tropical and subtropical climates. The oil and a by-product menthol and dementholized oil (DMO), respectively of this plant have the highest share in the global mint trade. Price fluctuation in marketing of mentha oil. The price of mentha oil price of oil was very fluctuating in nature. The price range was found Rs.1250 to Rs. 2250 per liter price of oil fluctuated within a day to day and month to month. The price of oil is lowest in the harvesting season (June-July) and highest in other month. The cultivation of mentha crop has crossed the boundary of traditional agriculture the mentha crop is new introduction whereas mentha grown for cash crop not for family consumption. The oil obtains after the distillation of crop plant has great commercial value. There is no direct use of plant as fodder etc. Because of having high content of menthnl. Due to very high economic return from mentha crop farmer are expected to take injudicious for utilizing of available resources, knowledge and technology for production of mentha in comparison to the other crop to be grown on the farm. This decision depends on their resources viz. soil climate irrigation and other facilities like processing

(distillation unit) available. The mentha crop is very short duration period about three months are taking from transplanting up to harvesting. Being water requiring crop irrigation facilities are a very important factor in resources allocation under mentha crop. *Mentha arvensis* L. is cultivated in many parts of the world for the production of menthol from its essential oil which is used in pharmaceutical, perfumery and food industry.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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